

August 27 - September 1, 2022
Ottawa, Ontario, Canada

13th International Conference on Environmental Mutagens

Maintaining Genomic Health in a Changing World

.....
**53rd Annual Meeting of the Environmental
Mutagenesis and Genomics Society**

www.ICEM2022.org

ICEM 2022 Sponsors List

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Journal of Biochemistry
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13th INTERNATIONAL CONFERENCE ON ENVIRONMENTAL MUTAGENS

Maintaining Genomic Health in a Changing World

August 27 – September 1, 2022

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Robert Bevans-Kerr



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Suite 202
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Email: emgshq@emgs-us.org
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Dear Colleagues,

On behalf of the Organizing Committee, we wish to extend a warm welcome and invitation to you to participate in the 13th International Conference on Environmental Mutagens (ICEM). We are excited to see you in person after nearly two years of virtual meetings. This conference is sponsored jointly by the Environmental Mutagenesis and Genomics Society (EMGS) and the International Association of Environmental Mutagenesis and Genomics Societies (IAEMGS). The ICEM will be held at the Westin Hotel and Conference Centre in the heart of Ottawa, Canada's multicultural capital city. The venue is just steps away from the Rideau Canal (a World Heritage Site), Ottawa's historic Byward Market, several of Canada's national museums, and the Ottawa River that divides the provinces of Ontario and Quebec.

The theme of the ICEM is "Maintaining Genomic Health in a Changing World", encompassing both our changing exposures and ground-breaking tools available to assess adverse genomic effects. We are experiencing unprecedented changes to our environments that shape our genome, spanning the impacts of pandemics and global warming, to the realization of space tourism and methodologies that allow us to modify the genomes of species at will. Harnessing our evolving technologies to understand how the genome and our health may be impacted in these new situations is increasingly critical. Data-rich and quantitative sources of mechanistic information, innovative in vitro models and tools, artificial intelligence and novel bioinformatics platforms, and in the clinic, opportunities to tailor disease treatments and custom-design drugs, will play central roles to the future of public health. Today more than ever, understanding how our changing environment shapes our genomes and the resulting health effects requires global effort.

To explore these issues and solutions to key global threats to our collective health, the 13th ICEM will offer 30 symposia and 5 workshops, as well as 13 plenary lectures from world leaders in environmental mutagenesis, genomics, and related fields. Speakers will present the latest findings on how chemical, physical and biological agents damage our genomes, the cellular processes that deal with induced DNA damage, the health consequences of unrepaired damage, and regulatory advances in these areas. Provocative keynotes will challenge our community to consider different perspectives, opportunities, and threats. The program will offer a balance of basic and applied research symposia on using cutting-edge approaches to answer fundamental questions on the ability of our species to respond and adapt to environmental insults and maintain genomic health in the face of a world that is continuously changing around us. Researchers from around the world will present the latest work in poster and platform sessions and interact with other attendees to develop future collaborations. Specific activities for students and new investigators will foster interest in environmental mutagenesis and mentor the next generation of scientific leaders. The conference will also feature social events to provide many opportunities for informal interactions, such as group tours, a free afternoon, a wine and cheese at the National Art Gallery, and a banquet and opportunity to privately view artefacts in Canada's Museum of History. A program of tours and special events for accompanying family members will also operate throughout the week.

You won't want to miss the many important opportunities for international communication and education offered by the 13th ICEM. We enthusiastically look forward to welcoming you to Ottawa in August, 2022.

Paul White
Program Co-Chair, IAEMGS President

Francesco Marchetti
Program Co-Chair, EMGS Vice President

Carole Yauk
Program Co-Chair, EMGS Past President

Workshops pg. 20-22

- Miniaturized versus Standard Ames Assays: What Have we Learned from the OECD Retrospective Performance Assessment
- Time to Solve a Crisis? Can Risk from Exposures to the DNA-reactive Botanical Contaminant Family Pyrrolizidine Alkaloids be managed through Relative Potency Factors (RPF's)?
- Leveraging the CometChip Platform for Studies of DNA Damage and Repair
- In silico Approaches in Genetic Toxicology: Application of Ames QSAR to ICH-M7
- Advances in Error-corrected Sequencing Technologies for Mutation Detection

Opening Session pg. 23

Opening Reception pg. 23

Plenary Lectures pg. 23-24

- Adebawale Adeyemo
- Amander Clark
- Ajay Pillariseti
- Cynthia Burrows
- Graham Walker
- Kym Boycott
- Linda Birnbaum
- Maurice Whelan
- Mayana Zatz
- Michael Stratton
- Stephen Scherer
- Ulla Vogel
- Yukari Totsuka

Platforms pg. 24

- Advances in DNA Repair I
- Advances in DNA Repair II
- Bioinformatics and Data Sciences
- Emerging Public Health Issues
- Environmental Mutagens I
- Environmental Mutagens II
- Epigenomics and Heritable Effects
- In vitro Testing Strategies
- In vivo Testing Strategies
- Risk Assessment

Symposia pg. 25-39

Applied Genetic Toxicology

- Advancing Mechanistic Analyses in Genetic Toxicology Using High-Content and High-Throughput Methodologies
- Developing Integrated Approaches to Testing and Assessment (IATA) Using an Adverse Outcome Pathway (AOP) Framework
- Genome Editing: Intentional Mutagenesis of the Genome and Implications for Human Health
- International Workshop on Genotoxicity Testing: Summary of Consensus Statements
- Mutagenic Hazards of PAHs and PAH Mixtures

Computational Toxicology and Bioinformatics

- Application of Computational Modeling and Bioinformatics in Toxicological Hazard and Risk Assessment
- Cancer Genomics Provides Insight into Cancer Etiology, Progression and Therapeutic Response
- Carcinogens, Carcinogenesis and Cancer: Application of Artificial Intelligence & Machine Learning

DNA Repair

- How Cells Tolerate and Replicate DNA Damage?
- Polynucleotide Signatures and Regulation of Genotoxin Stress Response
- R-loop Roadblocks to Transcription and Replication
- Role of RNA in DNA Repair
- The Graham Walker Symposium: Complexity of Cellular Responses to DNA Damage
- DNA Cross-link Repair and Health

Ecogenotoxicology

- From Genomes to Ecosystems: What are the Ecological Consequences of Genotoxicity?

Epigenetics

- Analyses of DNA Modifications and their Roles in Human Carcinogenesis



Genomics

- Dynamics of Mutation Acquisition in Somatic Cells: SNVs and SVs in the Brain, Blood and Beyond

Germ Cell and Heritable Effects

- Consequences of Pharmaceuticals and Chemicals for Male and Female Germ Cells and Heritability
- De novo Germline Mutations and Environmental Mutagenesis

In Vivo Genotoxicity Assessment

- Novel Experimental Strategies for Investigating the Incidence and Mechanisms of Mutations

Public Health and Molecular Epidemiology

- Approaches for Studies of DNA Damage and Repair with Applications in Human Biomonitoring and Disease Risk Prevention
- Genotoxic Hazards of Air Pollution- A Global Perspective
- Impact of Obesity on DNA Stability and its Health Consequences
- Personalized Cancer Risk and Prevention: Models Integrating Genetics, Environmental Exposures, Infections, Diet, and Other Factors for Specific Cancers

Radiation Biology

- Managing Genes in Space

Risk Assessment

- In Vitro Screening Approaches for Risk Assessment
- New Approaches for Informing Population Variability in Chemical Risk Assessment
- New Tools in Carcinogenicity Testing
- Risk Assessment of Low-dose Rate Radiations, Lessons from the Fukushima Nuclear Accident

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Satellite Meetings pg. 42

- International Workshops on Genotoxicity Testing (IWGT)
- Samuel H. Wilson Memorial Meeting: DNA Damage & Repair

Banquet pg. 18

Grand Hall at the Canadian Museum of History

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International Association of Environmental Mutagenesis and Genomics Societies (IAEMGS)

Asociación Latinoamericana de Mutagénesis,
Carcinogénesis y Teratogénesis
Ambiental (ALAMCTA)
Brazilian Association of Mutagenesis and Environmental
Genomics (MutaGen-Brasil)
Chinese Environmental Mutagen Society (CEMS)
European Environmental Mutagenesis and Genomics
Society (EEMGS)
Environmental Mutagenesis and Genomics Society
(EMGS)

Environmental Mutagen Society of India (EMS India)
Iranian Environmental Mutagen Society (IrEMS)
Japanese Environmental Mutagen Society (JEMS)
Korean Environmental Mutagen Society (KEMS)
Molecular and Experimental Pathology Society of
Australasia (MEPSA)
Pan-African Environmental Mutagen Society (PAEMS)
Philippines Environmental Mutagen Society (PEMS)
Thai Environmental Mutagen Society



The Conference and the Venue

13th ICEM

The theme of the 13th ICEM, Maintaining Genomic Health in a Changing World, transcends national boundaries; indeed, it encompasses timely issues for all people of the world. This meeting attracts approximately 1,000 scientists from industry, academia and government. The program includes an array of plenary and other special lectures, workshops, symposia on emerging issues and new discoveries, platform sessions with speakers chosen from the submitted abstracts, and poster sessions.

Why Attend the Meeting?

The International Association of Environmental Mutagenesis and Genomics Societies (IAEMGS) includes the world's primary societies of scientists involved in research pertaining to environmental mutagenesis, the functional consequences of mutagenesis, DNA damage and repair, and public health and regulatory issues relating to damage to the genome. The 13th ICEM meeting will provide attendees with unprecedented opportunities to learn about recent and important advances in these and related areas. The meeting brings together basic and applied scientists, as well as regulatory decision-makers, all of whom strive to assess chemical safety and elucidate the mechanisms by which environmental genotoxicants alter the genome. The result will be a dynamic conference that covers a broad range of contemporary topics and facilitates interactions between world-class scientists, regulatory decision-makers, students and new investigators. We invite you to join us in Canada's capital city, and hope that you will enjoy all that Ottawa has to offer; all while acquiring new knowledge, renewing old friendships and making new acquaintances.

Special Interest Groups

EMGS is home to eight Special Interest Groups, which meet each year during the annual meeting. The Special Interest Group meetings are scheduled from 7:00AM until 8:00 AM prior to the Plenary Lectures. The meetings are open to all ICEM attendees at no additional charge.

The Special Interest Group meetings promote information and discussion on topics relevant to their group. The meetings serve as an opportunity to share new research data and to network with other individuals who share a similar focus in that particular area. The eight Special Interest Groups are:

- Applied Genetic Toxicology
- DNA Repair & Mutagenic Mechanisms
- Epigenomics
- Genomics and Data Sciences
- Genotoxicity Risk Assessment and Public Health
- Germ Cell and Heritable Effects
- In Vivo Mutagenesis
- Women in EMGS

Ottawa

Ottawa is Canada's capital, a dynamic showcase city of more than one million people. Located in Ontario at the Quebec border, it's a place where you'll hear English and French spoken in the streets; where you can discover Canada's proud heritage at impressive national sites and famous landmarks, including the Rideau Canal (a UNESCO World Heritage Site). It's a city steeped in culture, with world-class museums and galleries displaying stunning national collections and special exhibitions from Canada and around the world.



The Westin Ottawa

Located in the heart of Canada's Capital, The Westin Ottawa is within five minutes of the National Gallery of Canada, the Canadian War Museum and Parliament Hill. The hotel is attached to the Rideau Center, a shopping mall filled with restaurants and boutique shops, and only one block from the historic Byward Market. In this outdoor market, one can find fresh flowers, fruits and vegetables and local artisans. The Westin Ottawa offers breathtaking views of the Rideau Canal, allowing access to all our city has to offer. See more of the city through BikeWESTIN. This service allows you to rent a BMW bike to see the beautiful city of Ottawa your way. For more information on The Westin Ottawa visit: [The Westin Ottawa Hotel in Downtown Ottawa](#) | [The Westin Ottawa \(marriott.com\)](#)



Climate

Ottawa is the seventh coldest capital in the world, but its summers are warm enough to attract visitors from around the globe. The average daily high temperature in late August is 78°F (26°C) and the average lows for this time of the year is around 58°F (14°C) with an average monthly rainfall of 3.66 inches (9.3 cm).

13th ICEM Travel

International Invitation to Attend

The International Association of Environmental Mutagenesis and Genomics Societies (IAEMGS) and the Environmental Mutagenesis and Genomics Society (EMGS) invite scientists from around the world to attend the 13th International Conference on Environmental Mutagens (13th ICEM) and 53rd Annual Meeting of the Environmental Mutagenesis and Genomics Society being held from August 27 – September 1, 2022 at the Westin Ottawa in Ottawa, Ontario, Canada. Please note that individual invitations are not required for attendance at the meeting. Since the meeting consists of open scientific events, publication of the program in this booklet invites interested persons to attend. You may request a formal invitation letter by sending your name, address, and fax number to the EMGS headquarters office. If you are presenting at the meeting, please include the title and date of your presentation. You will need to make your own hotel reservations and register for the meeting. We request that you contact the Canadian Consulate/Embassy in your own country regarding documentation and necessary information for your visit to Canada. If you need assistance, please contact the EMGS headquarters office: telephone: (904) 719-8584; fax: (904) 513-2666; or email: emgshq@emgs-us.org.

Passports & Visas

A valid passport is required for travel in and out of Canada for residents of all countries, including the United States if travelling by air. Residents of some countries may also require a visa or Electronic Travel Authorization (eTA). [Passports and embassies | Ottawa Tourism](#)

COVID-19 Travel Restrictions

Covid-19 restrictions are still in place for all travelers to Canada. If you qualify as a fully vaccinated traveler, you are: required to show a pre-entry molecular test, required to use ArriveCAN, required to take an arrival test if selected, exempt from quarantine, exempt from Day-8 testing. These requirements and exemptions are likely to change before the 13th ICEM, but are updated frequently on this website: [Visiting Ottawa safely during COVID-19 | Ottawa Tourism](#). Please stay informed about Covid-19 restrictions in Canada here: [COVID-19 vaccinated travelers entering Canada - Travel restrictions in Canada - Travel.gc.ca.](#)





Registration

Online registration and early registration is strongly encouraged. The Early Bird Registration deadline is Sunday, May 1, 2022. **The meeting registration for the 13th ICEM includes admission to all scientific sessions and the banquet.** Separate fees are required to attend workshops and tours. The program of the meeting and the abstract book will be provided in a downloadable PDF version for registrants. EMGS will accept registrations until August 5, 2022. After August 5, 2022, you must register on-site at the meeting. There is no reduced fee for one-day registration.

Free Day for Students

Rather than register and attend the entire conference, a student (not a post-doctoral investigator) may attend 1 (and only 1) day free of charge; food not included. Application for this option must be received by August 1, 2022, at the EMGS Headquarters, EMGS Headquarters 12627 San Jose Blvd. Suite 202, Jacksonville, FL 32223, USA. Please (1) state the day you wish to attend, and (2) include a letter from your department chair or professor stating that you are a student in good standing at your university. Please be prepared to show a student I.D. at the registration desk.

Online Registration

All attendees are invited and encouraged to register for the ICEM meeting using the online registration system.

Online registration opens January 4, 2022. The system is designed for those who will be paying their registration fee by credit card and who have internet access. Registration information can be accessed via the ICEM website, www.icem2022.org. Simply go to the homepage and click on the word Registration. Forms are also enclosed on page 41. The **Flash Your Badge Program** allows registrants use their conference badge to access discounts for them and a guest at participating attractions, restaurants, and tours. More information will be available about this program soon.

Registration Materials

Badges and registration materials will be available to registrants on-site on Saturday, August 27, 2022. Your ICEM registration badge must be worn to obtain access to the ICEM functions. If you are attending the banquet or a Workshop, you will need to present your ticket to be allowed access. If you register for these events in advance, the tickets will be a part of your registration materials.

Deadline Dates

Awards and Honors Nomination:	December 10, 2021
Travel Award Application:	February 28, 2022
Abstract Submission:	April 1, 2022
Early Bird Registration:	May 1, 2022
Hotel Reservation:	June 28, 2022
Student Free Day Application:	August 1, 2022
Standard Registration:	August 5, 2022
(After August 5 you must register onsite)	

Registration Opens January 4, 2022, all amounts in USD:

	Early Bird Registration (Received by May 1, 2022)	Standard Registration (May 2 - August 5, 2022)	On-Site Registration (After by August 5, 2022)
Regular Delegates.....	\$775.....	\$825.....	\$975.....
Student/Postdocs/New Investigator.....	\$375.....	\$435.....	\$475.....
Emeritus Members.....	\$375.....	\$435.....	\$475.....
Accompanying Person.....	\$250.....	\$325.....	\$375.....
(All registrations include welcome reception, banquet, and wine and cheese reception)			
Guest Banquet			
	Early Bird Registration (Received by May 1, 2022)	Standard Registration (May 2 - August 5, 2022)	On-Site Registration (After by August 5, 2022)
Guest Banquet Ticket.....	\$85.....	\$115.....	\$135.....
Workshops			
	Early Bird Registration (Received by May 1, 2022)	Standard Registration (May 2 - August 5, 2022)	On-Site Registration (After by August 5, 2022)
Regular Delegates.....	\$125.....	\$175.....	\$225.....
Student/Postdocs/New Investigator.....	\$65.....	\$115.....	\$165.....
Satellite Meetings			
Samuel H. Wilson		Student & New Investigator Registration	Regular Registration
Memorial Meeting: DNA Damage & Repair.....		\$50.....	\$100.....

Sponsorship and Exhibits

General

Sponsors

The organizers would like to invite your organization to be a proud sponsor of the 13th ICEM. Sponsor Names are prominently displayed on the 13th ICEM Website as well as in printed materials that are distributed before and during the meeting. Sponsorship is also recognized through signage displayed at the 2022 meeting site.

There are five levels of sponsorship available: Diamond (\$20,000), Platinum (\$10,000), Gold (\$7,500), Silver (\$5,000), Bronze (\$3,500), and Supporters (\$2,500). You will find a complete menu of sponsorship opportunities designed to assist your organization in establishing a [leadership position at the 13th ICEM on the EMGS Annual Meeting Website](#).

For more detailed information about the 13th ICEM sponsor, contact Bob Bevans-Kerr at (904)-289-3410 or emgshq@emgs-us.org

Exhibits

The 13th ICEM will focus on 12 thematic topics ranging from Public Health and Molecular Epidemiology, Mechanisms of DNA Damage and Repair, Novel In vitro and In Vivo Strategies for Genotoxicity Assessment, and Computational Toxicology and Bioinformatics. Is your company interested in these important topics? If the answer is “yes” to even one of the topics, then your company should be exhibiting at the ICEM in Ottawa.



Hotel Accommodations and Reservations

A limited block of discounted rooms at the Westin Ottawa has been reserved for the 13th ICEM. Rates have been contracted for ICEM registrants and you are encouraged to help us fill the contracted room block by booking first at the Westin Ottawa. You can make your reservation online (preferred) or by calling Westin Ottawa +1 (613) 560-7000 and referring to the Environmental Mutagenesis and Genomics Society or 13th ICEM to receive the discounted rate.

Attendees are encouraged to book reservations online for the 13th ICEM. Be sure to make your reservation early in order to take advantage of the special meeting rate. Make your reservations online by visiting www.icem2022.org.

All cancellations and changes should be made directly with the hotel. Hotel reservation deadline is June 28, 2022.

The Westin Ottawa puts you right in the heart of Ottawa. Located on the beautiful Rideau Canal, you'll enjoy stunning views of Parliament Hill and be steps away from Byward Market and many of Ottawa's most popular attractions. The spacious rooms and suites offer relaxing décor and modern amenities.

The Westin Ottawa

11 Colonel By Drive
Ottawa, Ontario
K1N 9H4, Canada

Standard Room Rates

Traditional (Single/Double): \$239 CAD
Deluxe (Single/Double): \$279 CAD
Suites (Single/Double): \$369.00 CAD and up
Additional Person: \$40 CAD

Roommate Matching Service

Individuals interested in sharing a room with another attendee may sign-up for the roommate matching service through the website, www.icem2022.org. Requests to share a room should be submitted by May 1, 2022. Individuals using this service will be provided with a list of names with similar housing requirements by May 15, 2022. Individuals will be responsible for contacting the potential roommate and making the hotel reservation. EMGS will not be responsible for securing housing for participants of the roommate matching service. All housing arrangements are the responsibility of the individual(s).

Accessibility for Persons with Disabilities

The Westin Ottawa is accessible to persons with special needs. If you require special services, please mark the appropriate box on the hotel and registration forms. If you require more information about disabled access please contact the EMGS headquarters office at (904) 719-8484 or emgshq@emgs-us.org.

Overflow Hotels:

Les Suites Hotel Ottawa

Deadline: Friday, July 15, 2022
Premier One Bedroom Suites: \$209 CAD /night (single/ double occupancy)
Premier One Bedroom Suites: \$359 CAD /night (single/ quad occupancy)\$25 CAD /night for each additional person.

Lord Elgin Hotel

Deadline: Thursday, July 27, 2022
Classic Guestrooms \$229. CAD

Fairmont Chateau Laurier

Deadline: Friday July 28, 2022
Guestroom rates: \$289. CAD

Transportation

Air Transportation

Airports

Ottawa is served by one major airport: **Ottawa MacDonald-Cartier International Airport (YOW)** which is approximately 20 minutes from the hotel. More information on getting to Ottawa can be found here: [Getting here | Ottawa Tourism](#). For airline booking assistance information, visit here: [Airlines | YOW](#)

Transportation from the Airport

Access to downtown from the airport is a quick 20 minute transfer via public bus or in a taxi (approximately \$40 CDN). Anyone looking to explore beyond Ottawa's vibrant downtown can utilize Ottawa's exceptional public transportation system offering easily accessible bus and light rail options (www.octranspo.com). Standard taxi and Uber services are also available throughout the city.

The [Société de Transport de l'Outaouais](#), also known as STO offers tickets and day passes at service points and recharge stations at select pharmacies, convenient stores and malls.

Ottawa's taxi companies can be booked ahead of time through their convenient apps, text messages or online options for seamless pick ups and drop offs, including to and from the airport.

Blue Line is the largest taxi company in the City of Ottawa. To order a taxi, please call (613) 238-1111 or book your next taxi through the app at bluelineapp.com.

Capital Taxi, a family owned and operated company since 1937, serving Ottawa & surrounding areas, is available 24/7. Download the app at capitaltaxiapp.ca or text your address to (613) 744-3333.

Car Rental

Alamo
PARKADE (P1), Level 1
Hours: 6:30 a.m.-1:00 a.m.
(613) 737-7023
www.Alamoca

Avis
PARKADE (P1), Level 1
Hours: 6:30 a.m.-1:00 a.m.
(613) 739-3334
www.Avis.ca/en/locations/ca/on/ottawa/yow

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PARKADE (P1), Level 1
Hours: 6:30 a.m.-1:00 a.m.
(613) 521-4844
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1749 Bank Street (Shuttle available)
Hours: 7:30 a.m.-10:00 p.m.
(613) 667-9393, (613) 667-9394
www.DiscountCar.com

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(613) 248-0005
www.Enterprise.com

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(613) 521-3332
www.ThriftyCanada.ca

Additional Transportation to the Banquet

Au feel de l'eau – Aqua Taxi

Hop on the 100% electric and universally accessible Aqua-Taxi on your way to the ICEM 2022 banquet. Stops on the continuous short trip circuit include the Ottawa Locks near the Bytown Museum, the Canadian Museum of History, and Richmond Landing near the Canadian Museum. Depending on the route you will enjoy view of Parliament Hill, Supreme Court of Canada, the National Gallery of Canada and Rideau Falls. Make your reservation here: www.aquataxi.ca.

General Information

Photography Policy During Sessions

Photography of scientific presentations is prohibited without advance specific consent of the presenter(s)/author(s). Session Chairs are asked to strictly enforce this policy and individuals who do not comply will be asked to leave the session. Media Support Services: ICEM 2022 welcomes accredited representatives of media organizations. Please contact Kailee Canty at EMGS & IAEMGS Headquarters at kaileec@emgs-us.org.

Emergency Services

- Emergency: 911
- Poison Information Centre: 613-737-100
- Ottawa Fire Services: 613-580-2860
- Ontario Provincial Police: 888-310-1122
- Ottawa Police: 613-236-1222

Currency Exchange

The Canadian Dollar is the only acceptable form of payment in Canada. The hotel reception offers currency exchange facilities. Additional currency exchange can be found just steps away from the hotel in the Rideau Centre at the Calforex Currency Exchange located at 350B-50 Rideau Street.

Banking

Banking hours differ by bank and branch, but are generally the same as common working hours (9 a.m. to 5 p.m.). Some banks are open later or on weekends or Thursday evenings. Most businesses accept debit cards as a form of payment. Most major credit cards are accepted in Ottawa. WeChat Pay and Alipay is accepted at select businesses.

Automated Teller Machines (ATMs) are located in banks and in various other locations throughout the city. They are usually available during and outside of regular banking hours, although often with an additional service fee.

ATM

There is an ATM in the hotel lobby near the reception and for your convenience there are also other banks and ATMs within four blocks of the hotel.

CIBC, Canadian Imperial Bank of Commerce
50 Rideau St. Suite 2 Ottawa, ON K1N9J7

41 Rideau St. Ottawa, ON K1N5W8 98 George Street
Ottawa, ON K1N5W2



BMO, Bank of Montreal
101 Colonel By Dr. Ottawa, ON K1A0K2

200 Rideau St. Ottawa, ON K1N5X8

National Bank
232 Rideau St. Ottawa, ON K1N5Y3

303 Rideau St. Ottawa, ON K1N5Y4

RBC Royal
96 George St. Ottawa ON K1N5W1

Insurance

Participants are advised to provide their own personal insurance as the 13th ICEM cannot assume responsibility on behalf of participants for personal accidents, sickness, theft, or property damage.

Stay Connected While You Travel

As technology advances and with guests traveling from all over the world, the ICEM Organizing Committee appreciates how important it is for attendees to stay connected to daily responsibilities in their home locations while attending the meeting. WiFi is available in all guest rooms at the Westin.

Area Code/Phone Dialing in Ottawa, Ontario

The area codes for Ottawa are 343 and 613. Callers must dial 1 plus the appropriate area code and seven-digit number.



General Information (cont.)

Electrical Appliances

North American Outlets require appliances with 110V compatibility.

Tipping

Restaurants

Restaurant service is not usually included in the restaurant checks. The average tip is 15-20% of the total check.

Taxis

Average tip for driver is 10-15% of the fare.

Tax

A non-refundable 13% sales tax (HST) must be paid on most goods and services, unless you have the merchant ship the product out of Canada. This tax will not be refunded at the airport upon departure.



Social Programs

Excursions

Optional tours will be available for meeting attendees and their guests. A variety of tours for ICEM registrants and guests have been arranged for Wednesday afternoon when there are no sessions. This is an excellent opportunity to relax with your colleagues. There are also evening events, as well as Accompanying Guest Tours that take place during symposium sessions. Participation is optional and costs are incurred by participants through a separate registration process.

Most tours include transportation and the opportunity to network with other attendees of the 13th ICEM. Many tours have a minimum number of people required. If the minimum numbers are not met, you will have the option to attend a different tour or your money will be refunded. Cancellations will not be accepted after July 1, 2022.

Student and Post-Doctoral Fellows

Students and post-doctoral fellows are invited to attend a special networking session on August 27 at 1:00pm until 3:00pm in the Provinces Ballroom. Presentations from research mentors and trainees will be made, followed by a social activity. This event is open to student and post-doctoral fellow registrants.

Banquet

The Banquet will be held at the Grand Hall in the Canadian Museum of History on Wednesday, August 31 at 6:00pm until 10:00pm. The Banquet will begin at 6:00pm for guests to view the museum for an hour, and dinner will be served at 7:00pm.

Wine and Cheese Reception

A wine and cheese reception will be held in the National Gallery of Canada from 6:30pm until 8:00pm on Monday, August 29, 2022.

Opening Session and Reception

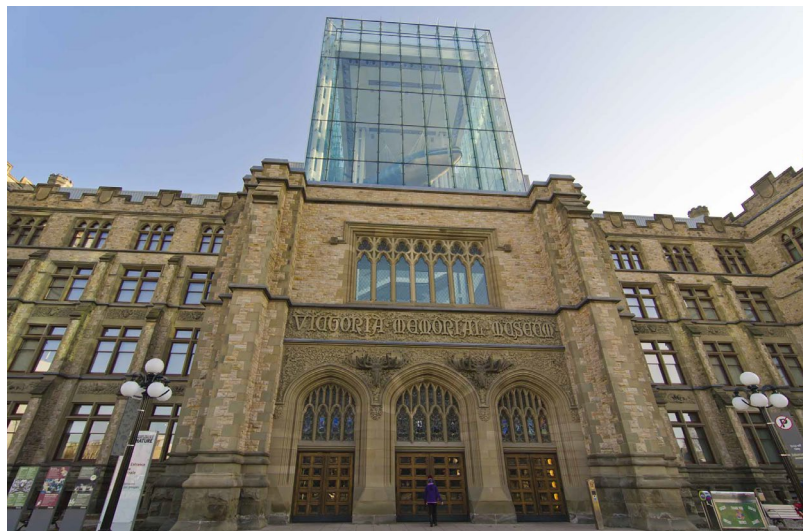
The Opening Session will be held in the Shaw Centre on Saturday, August 27 at 4:00pm until 5:30pm. The Opening Reception will immediately follow in the Shaw Centre. Badges are required for both events.

General



Awards and Honors

EMGS invites nominations for (1) the EMGS Award for outstanding basic research in the field of environmental mutagenesis; (2) the Alexander Hollaender Award, for outstanding contributions in the application of the principles and techniques of environmental mutagenesis and genomics to the protection of human health; (3) the EMGS Service Award, for sustained dedication and service to the goals, operation and welfare of the EMGS; (4) the EMGS Education Award, for long-standing dedication to educating and mentoring the future generation of scientists in the field of environmental mutagenesis. Additional information and submission forms are located on the EMGS Website www.emgs-us.org. The deadline for applications is **December 10th, 2021**.

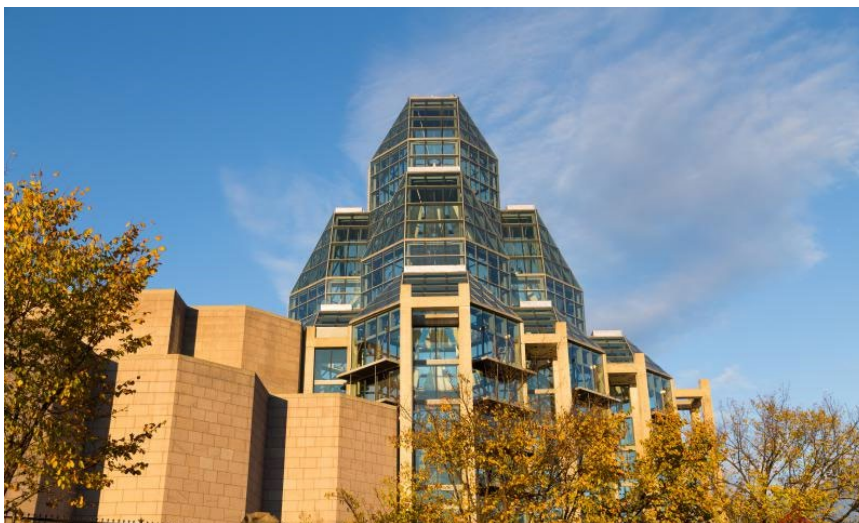


Student and New Investigator Travel Awards

Applications for students and New Investigator Travel Awards to attend the 13th ICEM are due to the Awards and Honors committee on **February 28, 2022**. Applications should be submitted through the EMGS Website: www.emgs-us.org. Applicants are required to have an abstract approved for presentation during the 13th ICEM. Please indicate your intention to apply for a Travel Award on the abstract form.

Hollaender ICEM Travel Award

These 25 travel awards will be dispersed to selected students, new investigators, and early career investigators. Applications must be received by **February 28th, 2022**. Applications should be submitted through the EMGS Website: www.emgs-us.org. The applicant is required to have an approved abstract for presentation during the 13th ICEM. Please indicate your intention to apply for a Travel Award on the abstract form.





Workshops

Miniaturized versus Standard Ames Assays: What Have we Learned from the OECD Retrospective Performance Assessment

Chair: Birgit Mertens, Sciensano, Brussels, Belgium

Date/time: Saturday, August 27, 8:00am – 12:00pm ET

Several miniaturized versions of the bacterial reverse gene mutation (Ames) test have been developed and are already used, particularly for early screening of new products in industry research and development. However, results from these miniaturized assays are currently not widely accepted by regulatory agencies since they are not described in any existing OECD Test Guideline. In 2016, an OECD project was launched to (a) identify the types of miniaturized assays in use; (b) procure comparative data for those assays relative to the standard OECD TG471 bacterial reverse gene mutation test; (c) evaluate the performance of each of the miniaturized versions compared to the standard assay; and (d) make recommendations regarding the utility of the miniaturized assays for regulatory purposes. This workshop will present a short overview of the different miniaturized Ames assays, the final results of the retrospective assessment and recommendations following from this assessment.

Overview of the OECD Process to Evaluate Miniaturized Ames Assays Including Description of the Different Assays

Birgit Mertens, Sciensano, Brussels, Belgium

Regulatory Perspectives on Assay Utility and Acceptance

Federica Madia, EURL ECVAM, Italy

Industry Perspectives on Assay Utility and Current Use
Leon Stankowski, Charles River, United States

Outcome of the Retrospective Performance Analyses

Paul White, Health Canada, Canada

Strengths and Limitations of the Retrospective Analyses, Recommendations and Next Steps

Dan Levy, FDA, United States

Discussion and Closing Summary

Birgit Mertens, Sciensano, Brussels, Belgium

Time to Solve a Crisis? Can Risk Stemming from Exposures to Plant-based DNA-reactive Pyrrolizidine Alkaloids be Managed Using Relative Potency Factors (RPF's)?

Chair: Stefan Pfuhler, Proctor & Gamble, Mason, Ohio, United States

Date/time: Saturday, August 27, 8:00am – 12:00pm ET

Pyrrolizidine alkaloids (PAs) are common plant constituents that can be found as contaminants in teas, herbs and honey, but are also sometimes found at higher concentrations in herbal medicinal products. The PA constituent family includes DNA reactive rodent hepatocarcinogens and the questions in this workshop address two risk scenarios: a high exposure scenario through Asian herbal medicines and the increasing indication that this is an important health issue that needs to be managed, and the low exposure scenario through difficult to avoid low-level contamination of plant-based products with PAs. In the context of managing these risk scenarios the use of relative potency factors (RPFs) will be discussed. To do this successfully, knowledge of their potency to damage DNA as well as knowledge of toxicokinetic factors that enable IVIVE modelling is necessary.

Leveraging the CometChip Platform for Studies of DNA Damage and Repair

Chair: Bevin Engelward, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

Date/time: Saturday, August 27, 8:00am – 12:00pm ET

The comet assay is an established method for detecting DNA damage. The underlying principle of the comet assay is that damaged DNA migrates more readily in agarose, giving the appearance of a comet-like shape. The traditional comet assay is broadly used, despite the fact that it is laborious, low-throughput, and often suffers from poor reproducibility. The CometChip was developed to overcome these limitations by exploiting a mammalian cell array. Rather than individual glass slides for every sample, the CometChip enables use of a standard 96-well plate format. With its more rapid imaging (dozens of comets can be captured in a single image due to their shared focal plane) and automated image analysis, the CometChip provides more than a 100-fold increase in throughput. It is also much easier to perform, and it has improved reproducibility. The focus of this workshop is to introduce the CometChip technology and to describe some of its many applications. Included will be descriptions of modifications that enable detection of bulky DNA adducts that form as a result of metabolic activation, and of its utility for the *in vivo* comet assay. There will also be a description of ongoing efforts to make the CometChip a component of the genetic toxicology battery and a description of its utility for studies of nanoparticles. Additionally, there will be a presentation on emerging software being developed using AI and there will be a hands-on demonstration. As such, this session has content to help newcomers to get started and to update users on its many applications and emerging opportunities.

Introduction to the CometChip and the *In Vivo* CometChip

Bevin Engelward, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

Developing an *in vitro* Alternative to the *in vivo* Comet Assay: DNA Damage Assessment in HepaRG Cells

Leslie Recio, Integrated Laboratory Systems, Inc., Research Triangle Park, North Carolina, United States

The Utility of CometChip in Nanogenotoxicological Studies

Christa Wright, Georgia State University, Atlanta, Georgia, United States

Analysis of Comets using In-house Software

Elliot Corless, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

Hands-on Demonstration of Technology and Informal Q&A

Cyrus Munshi, Bio-Tech, Inc., Orange Park, Florida, United States

In silico Approaches in Genetic Toxicology: Application Ames QSAR to ICH-M7

Chairs: Kei-ichi Sugiyama, NIHS, Tokyo, Japan, Catrin Hasselgren, Genentech, San Jose, California, United States

Date/time: Saturday, August 27, 8:00am – 12:00pm ET

This workshop will introduce the Ames / QSAR International Challenge Project and present the latest performance of QSAR tools with QSAR vendors and users. It will also present case studies from expert reviewers experienced in this new project. We will also discuss the effective risk management of mutagenic impurities. The overarching purpose of the workshop is to provide an opportunity for participants to present and discuss *in silico* approaches in genotoxicity assessment using Ames/QSAR.

Introduction

Kei-ichi Sugiyama, NIHS, Tokyo, Japan

Overview of Outcomes of 2nd Ames/QSAR Project

Ayako Furuhashi, NIHS, Tokyo, Japan

Outcome of ICH-M7 Expert Review Workshops in Japan

Masayuki Mishima, Chugai Pharmaceuticals, Tokyo, Japan

Undertaking Expert Review Under the ICH-M7 Guideline

Robert Foster, Lhasa Limited, Leeds, United Kingdom

Effective Expert Review Strategy for ICH-M7 Assessment

Roustem Saiakhov, MultiCASE, Inc., Cleveland, Ohio, United States

ICH-M7 Expert Review Procedures and Assessment of Specific Chemical Classes

Kevin Cross, Instem, Stone, United Kingdom

Assessment Strategy for Genotoxic Impurities Under ICH-M7 Based on *in silico* Approaches and Human Experts

Chihai Yang, MN-AN, Columbus, Ohio, United States, Mark Cronin, LJMU, United Kingdom, James Rathman, MN-AM, Columbus, Ohio, United States

(Q)SAR Evaluation of Drug Impurities from the US FDA Scientific Perspective

Naomi Krulak, FDA, Jefferson, Arkansas, United States

Compound and Class-specific Limits for N-Nitrosamine Impurities in Pharmaceuticals

Joel Bercu, Gilead Sciences, Foster City, California, United States

Advancing the Next Generation of Genetic Toxicology and Cancer Risk Assessment

Chairs: Sheroy Minocherhomji, Amgen, Thousand Oaks, California, United States, Robert Young, MilliporeSigma/BioReliance, Burnlington, Massachusetts, United States, Francesco Marchetti, Health Canada, Ottawa, Ontario, Canada

Date/time: Saturday, August 27, 7:30am – 3:30pm ET

Advances in next-generation sequencing make it feasible to analyze the whole genome of an organism in a matter of days. However, direct sequencing of DNA to evaluate mutagenesis in mammalian genomes is currently not possible with conventional next-generation sequencing because of an error rate (1 error per ~ 1000 sequenced bases) well above the mutant frequency of normal cell replication ($\sim 10^{-7}$ to 10^{-8}). In recent years, a set of new sequencing tools, termed collectively as Error Corrected Next Generation sequencing (EC-NGS), have emerged that allow the detection of rare mutations within the heterogeneous population of cells. These error-corrected sequencing technologies can be applied in any species/tissue and are poised to revolutionize genetic toxicology. New genomics approaches and paired-end NGS techniques are also allowing a better understanding of structural variation in the genome (eg, duplication and deletion of large genomic regions), characterization of induced genomic instability and their impact on health. The primary aim for this workshop is to educate the wider genetic toxicology community on basic methodologies and principles such as EC-NGS and other genomics approaches, including wet lab and bioinformatic approaches available. The workshop will provide an opportunity to learn about the various EC-NGS, paired-end NGS and genomics platforms, understand the critical bioinformatics pipelines needed for extracting and analyzing data generated by these platforms. We will also cover other potential applications of these technologies for elucidating the mechanisms of mutagenesis for regulatory applications, cancer cell heterogeneity and basic biology.

Highlights

Program for Students/Postdocs

An informative and social program will be held on August 27 at 1:00pm until 3:00pm for students and post-doctoral fellows attending the 13th ICEM. This will be a time for students and post-doctoral fellows to meet and network with one another prior to the start of the meeting.

Students, Postdocs and New Investigators are also invited to join a Pub Crawl, an Ottawa scavenger hunt, and a Fun Run with the President; all organized by EMGS members! The EMGS Quest is also a fun way to capture the highlights of the EMGS meeting, network with peers, and win an Amazon gift card up to \$100. More information to follow!

Opening Session

The Opening Session will be held Saturday, August 27 at 4:00pm until 5:30pm. All registrants are encouraged to attend. Guests must be registered as an Accompanying Person to attend. Badges should be worn.

Welcome to the 13th ICEM

Carole Yauk, University of Ottawa, Ottawa, Canada

First Nation's Welcome and Dedication

Annie Smith St. George, Traditional Algonquin Elder and Teacher, Ancestral Algonquin Territory

Welcome from the President of the IAEMGS

Paul White, Health Canada, Ottawa, Canada

Welcome from the President of the EMGS

Joann Sweasy, University of Arizona, Tucson, Arizona, United States

Welcome to Ottawa

Professor Mona Nemer, Chief Science Advisor of the Government of Canada

Dr. George Douglas, Scientist Emeritus at Hleath Canada, Ottawa, Canada

Plenary Lecture: "Climate Change and Emerging Public Health Issues"

Linda Birnbaum, former Director of the US National Institute of Environmental Health Sciences, US NIH, Bethesda, Maryland, United States

Opening Reception

The Opening Reception will be held Saturday, August 27 from 5:30pm until 7:00pm ET in the Shaw Centre. All registrants are encouraged to attend. Guests must be registered as an Accompanying Person to attend. Badges should be worn.

Plenary Lectures

There will be thirteen (13) plenary lectures presented throughout the 13th ICEM. Two lectures will be presented each morning between 8:30am-10:00am, and one lecture from 1:30pm-2:30pm on Sunday, Monday and Tuesday. The speakers are listed in alphabetical order below:

Adebowale Adeyemo, MD

Deputy Director, US Center for Research on Genomics and Global Health, US NIH: National Institutes of Health

Amander Clark, PhD

Chair of the Department of Molecular Cell and Developmental Biology, University of California, Los Angeles

Ajay Pillarisetti, MPH, PhD

Assistant Professor, Gangarosa Department of Environmental Health, Rollins SPH, Emory University

Cynthia Burrows, PhD,

Department of Chemistry and Thatcher Presidential Endowed Chair of Biological Chemistry, University of Utah

Graham Walker, PhD

American Cancer Society Professor, Massachusetts Institute of Technology, member of US National Academy of Sciences

Local Spotlight: Kym Boycott, MD, PhD

Senior Scientist, Children's Hospital of Eastern Ontario and Chair of the International Rare Disease Research Consortium



13th International Conference on Environmental Mutagens

Agenda

Linda Birnbaum, PhD

Former Director of the US National Institute of Environmental Health Sciences, US NIH: National Institutes of Health

Stephen Scherer, PhD

Director, Center for Applied Genomics, Hospital for Sick Children

Maurice Whelan, PhD

Director of Systems Toxicology, European Center for the Validation of Alternative Methods, European Commission Joint Research Center

Mayana Zatz, PhD

Director of the Human Genome and Stem Cell Research Center, University of São Paulo

Michael Stratton, PhD

Director of the Wellcome Trust Sanger Institute

Ulla Vogel, PhD

Senior Research Professor, Danish National Center for the Working Environment

Yukari Totsuka, PhD

Professor, National Cancer Center Research Institute/ Nihon University, School of Pharmacy

Poster Sessions

Sunday, August 28, 2022	5:00pm - 6:00pm ET
Monday, August 29, 2022	4:00pm - 6:00pm ET
Tuesday, August 30, 2022	5:00pm - 7:00pm ET

Platforms

Sunday, August 28, 10:30am – 12:30pm ET

In vitro Testing Strategies

Sunday, August 28, 3:00pm – 5:00pm ET

Emerging Public Health Issues

Monday, August 29, 10:30am – 12:30pm ET

Advances in DNA Repair I

Tuesday, August 30, 3:00pm – 5:00pm ET

Environmental Mutagens I

Wednesday, August 31, 11:30am – 12:30pm ET

Advances in DNA Repair II

Wednesday, August 31, 11:30am – 12:30pm ET

Epigenomics and Heritable Effects

Wednesday, August 31, 11:30am – 12:30pm ET

Environmental Mutagens II

Wednesday, August 31, 11:30am – 12:30pm ET

Risk Assessment

Wednesday, August 31, 11:30am – 12:30pm ET

In vivo Testing Strategies

Thursday, September 1, 11:30am – 12:30pm ET

Bioinformatics and Data Sciences

The Symposia have been organized into twelve (12) categories. Refer to the program overview on page 2-3 for a quick listing of sessions and categories.

Applied Genetic Toxicology

Advancing Mechanistic Analyses in Genetic Toxicology Using High-Content and High-Throughput Methodologies

- Chairs:** *Alexandra Long*, University of Toronto, Toronto, Canada, *Daniel Roberts*, Charles River Laboratories, Skokie, United States, and *Eunnara Cho*, Health Canada & Carleton University, Ottawa, Canada
- Description:** This symposium examines the advantages of high-throughput and high-content assays for the detection of genetic damage, and explores the regulatory and mechanistic applications of data generated using such approaches. Join us as we showcase efforts to modernize regulatory genetic toxicity screening by incorporating innovative tools and analysis techniques.
- Date/time:** August 28, 2022, 10:30am – 12:30pm ET

Deciphering Drug Responses Using 2D and 3D Organoid Cultures of Primary Cells and High Content Screening

David Andrews, Sunnybrook Research Institute & University of Toronto, Toronto, Canada

Using Deep Neural Networks for Cytogenetics, Focused on the Cytome Assay with Additional Mechanistic Markers, Assessed Using Imaging Flow Cytometry

Paul Rees, Swansea University, Swansea, United Kingdom

Update on Existing High Throughput Methods for Detecting Key Adverse Cellular Events That Lead to Genotoxicity

Steve Bryce, Litron Laboratories, Rochester, New York, United States, *Bevin Engelward*, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States, *Julie Buick*, Health Canada, Ottawa, Ontario, Canada

GeneTox21- An Integrated Platform for In Vitro Genetic Toxicity Assessment and Regulatory Evaluation of New and Existing Substances

Hannah Battaion, Health Canada, Ottawa, Ontario, Canada

High-Content Imaging and Deep Learning: Opportunities and Challenges in Toxicology

John Wills, University of Cambridge, Cambridge, United Kingdom

Developing Integrated Approaches to Testing and Assessment (IATA) Using an Adverse Outcome Pathway (AOP) Framework

- Chairs:** *Anax Oliveria*, Lhasa Limited, Leeds, United Kingdom, *Bette Meek*, University of Ottawa, Ottawa, Canada
- Description:** In this session we will explore some new approach methodologies (NAMs), the information that can be generated from these, and how the results can be organized and reasoned in an AOP context to reach robust conclusions on human relevant genotoxicity risk.

Date/time: August 29, 2022, 10:30am – 12:30pm ET

Building and Characterizing Gene Expression Biomarkers to Predict MIEs Involved in Rat Liver Cancer AOPs

Chris Corton, U.S. EPA, Research Triangle Park, North Carolina, United States

Application of the ToxTracker Reporter Assay for Mode-of-action Assessment of Genotoxic Compounds

Giel Hendriks, Toxys, Leiden, The Netherlands

Converting Evidence to Knowledge Using an AOP Framework

Anthony Lynch, GSK, Hertfordshire, England

Integration of Data with AOPs to Support Genotoxicity Assessment

Steven Kane, Lhasa Limited, Leeds, West Yorkshire, England

Computational Solutions to Support the Application of AOPs in Safety Assessment

Crina Heghes, Lhasa Limited, Leeds, West Yorkshire, England

Genome Editing: Intentional Mutagenesis of the Genome and Implications for Human Health

Chairs: *P.J. Brooks*, NCATS, NIH, Bethesda, United States

Description: In genome editing, the genome is intentionally altered for the treatment and/or prevention of disease. This symposium will discuss ongoing activities in the genome editing field, including transcriptome sequencing to detect on/off target editing, a public-private genome editing consortium, and novel genome editing approaches based on DNA repair.

Date/time: September 1, 2022, 1:30pm – 3:30pm ET

The NIST Genome Editing Consortium

Samantha Maragh, National Institute of Standards and Technology, Gaithersburg, Maryland, United States

Transcriptome Sequencing to Detect Biological Effects of Genome Editing

Krishanu Saha, The Wisconsin Institute for Discovery, Madison, Wisconsin, United States

Genome Editing via the Chemical Modification of Nucleobases in Living Cells

Alexis Komor, University of California, San Diego, California, United States

International Workshops on Genotoxicity Testing: Summary of Consensus Statements

Chairs: *Hans-Joerg Martus*, Novartis, Basel, Switzerland, *David Kirkland*, Kirkland Consulting, Tadcaster, United Kingdom, *Andreas Zeller*, F.Hoffmann La-Roche, Basel, Switzerland

Description: Feedback from Working Group discussions of 7th IWGT

Date/time: September 1, 2022, 1:30pm – 3:30pm ET

Transcriptomic Biomarkers

Jiri Aubrecht, Sarepta Therapeutics, Cambridge, Massachusetts, United States

Predictivity of In Vitro Genotoxicity Testing, a Mathematical Modelling Approach

Mirjam Luijten, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands

Genotoxicity Dose-response Analysis for Potency Comparisons and Risk Assessment

Paul White, Health Canada, Ottawa, Canada

In Vivo Strategies

Carol Beevers, Broughton-Group, Earby, Lancashire, United Kingdom

Statistical Approaches and Data Interpretation

Stephen Dertinger, Litron Laboratories, Rochester, New York, United States

Epigenotoxicity and Germ Cell Effects

Roger Godschalk, Maastricht University, The Netherlands

Gene Therapy

Silvana Libertini, Novartis Institutes for BioMedical Research, Basel, Switzerland

Mutagenic Hazards of PAHs and PAH Mixtures

Chairs: *Jennifer Keir*, University of Ottawa, Ottawa, Canada, *Yasunobu Aoki*, National Institute for Environmental Studies, Tsukuba, Japan

Description: Polycyclic aromatic hydrocarbons (PAHs) are a family of more than a hundred compounds, some of which are genotoxic. In this symposium, exposures to and hazard identification of PAHs and PAH mixtures will be discussed.

Date/time: September 1, 2022, 1:30pm – 3:30pm ET

Genotoxic Effect of Polycyclic Aromatic Hydrocarbons Alone or in Mixture in Human Cells

Marc Audebert, l'Institut national de recherche pour l'agriculture, l'alimentation et l'environnement, Université Paris-Saclay, Paris, France

Adding up PAHs: Mixtures Studies to Inform Cumulative Risk Assessment

Cynthia Rider, NIEHS National Toxicology Program, Durham, North Carolina, United States

In Vivo Mutagenesis of PAHs and Related Compounds Contained in Airborne Particles

Yasunobu Aoki, National Institute for Environmental Studies, Tsukuba, Ibaraki, Japan

Biomonitoring Studies of Exposure to Airport Emissions, Diesel Exhaust and Firefighting

Anne Thoustrup Saber, The National Research Centre for the Working Environment, Copenhagen, Denmark

Firefighters' Combustion-derived PAH Exposures and Investigating Exposure Reduction Methods

Jennifer Keir, University of Ottawa, Ottawa, Canada

Computational Toxicology and Bioinformatics

Application of Computational Modeling and Bioinformatics in Toxicological Hazard and Risk Assessment

Chairs: *Julia Rager*, University of North Carolina, Chapel Hill, United States, *Marc Beal*, Health Canada, Ottawa, Canada

Description: The utility of *in silico* methods towards toxicological hazard and chemical risk assessment is rapidly expanding alongside advances in chemical screening and computational modeling approaches. This session provides timely updates on the integration of computational modeling and bioinformatics to address current problems in applied toxicology, exposure science, and risk assessment.

Date/time: August 28, 2022, 10:30am – 12:30pm ET

Systems Biology: Systematic Data Integration and Modeling for Toxicological Inference

Olivier Taboureaux, Université de Paris, Paris, France

Application of Artificial Intelligence in Toxicology

Weida Tong, U.S. FDA, White Oak, Maryland, United States

Applications of Computational Techniques for Data Identification and Evidence

Daniele Wikoff, ToxStrategies, Katy, Texas, United States

Application of Omic Technology for Estimation of Toxicological Potency

Scott Auerbach, US NIEHS, NTP, Durham, North Carolina, United States

Everything Else: Computational Exposure and Dosimetry Context for Risk Analysis

John Wambaugh, U.S. EPA, Washington, D.C., United States

Cancer Genomics Provides Insight into Cancer Etiology, Progression and Therapeutic Response

Chairs: *Barbara Parsons*, US Food and Drug Administration, National Center for Toxicological Research, Jefferson, Arkansas, United States, *Jiri Zavadil*, International Agency for Research on Cancer, Lyon, France, *Kelly Harris*, US Food and Drug Administration, National Center for Toxicological Research, Jefferson, Arkansas, United States

Description: The symposium will illustrate how cancer genomic/epigenomic data can elucidate epigenetic mechanisms of carcinogenesis, the natural history and clonal evolution of tumors, intratumor heterogeneity and its impact on tumor response, and the complex interaction between tumor cells and their microenvironment, including the immune environment.

Date/time: August 29, 2022, 10:30am – 12:30pm ET

Epigenetic Mechanisms Underlying Tumorigenesis and Approaches for Epigenetic Therapy

Daniel De Carvalho, Princess Margaret Cancer Centre, Toronto, ON, Canada

Immunogenomic Profiling of Tumour Microenvironments to Understand Cancer Treatments
Trevor Pugh, Princess Margaret Cancer Centre, Toronto, ON, Canada

Chemical-induced Somatic Mutation Signatures Identified by Next-generation Sequencing
Shoji Matsumura, R&S Safety Science Research, Kao Corporation, Japan

Multi-omics Analysis in Experimental Models of Carcinogen-mediated, Progressive Cell Transformation
Michael Korenjak, International Agency for Research on Cancer, Lyon, France

Variation in Cancer Driver Mutation Levels as a Metric of Clonal Expansion for Cancer Risk Assessment
Barbara Parsons, US Food and Drug Administration, National Center for Toxicological Research, Jefferson, AR, United States

Carcinogens, Carcinogenesis and Cancer: Application of Artificial Intelligence & Machine Learning

Chairs: *Luoping Zhang*, School of Public Health, University of California, Berkeley, United States, *Maria Zhiwagui*, Department of Cellular and Molecular Medicine, University of California, San Diego, United States

Description: Many cancer research studies generated myriad datasets from investigating carcinogenesis associated with exposures to toxic chemicals or therapeutic drugs. These potential carcinogens can be identified by artificial intelligence and machine learning (AI/ML) rather than traditional toxicological methods. Additionally, AI/ML is currently employed to explore the cancer mutation spectrum or other carcinogenic mechanisms.

Date/time: September 1, 2022, 1:30pm – 3:30pm ET

How Artificial Intelligence (AI) Can Beat Animal Testing at Finding Toxic Chemicals as Potential Carcinogens

Thomas Hartung, Department of Environmental Health and Engineering, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, United States

Predicting the Binding of Small Molecules to Nuclear Receptors Using Machine Learning and Molecular Modeling Techniques

Azhagiya Singam, Molecular Graphics and Computation Facility, College of Chemistry, University of California, Berkeley, California, United States

Benchmarking Artificial Intelligence and Machine Learning (AI/ML) Based Methods for Cancer Mutation Detection

Joshua Xu, Division of Bioinformatics and Biostatistics, National Center for Toxicological Research, US FDA, Jefferson, Arkansas, United States

Mutational Signatures and the Etiology of Human Cancers
Maria Zhiwagui, Department of Cellular and Molecular Medicine, University of California, San Diego, California, United States

A Multi-omic Approach and Bioinformatic Analysis of Exposures to Chemical Carcinogens
Luoping Zhang, School of Public Health, University of California, Berkeley, California, United States

DNA Repair

How Cells Tolerate and Replicate DNA Damage?

Chairs: *Carlos FM Menck*, University of Sao Paulo, Sao Paulo, Brazil,
Vanessa Gottifredi, Fundación Instituto Leloir, Buenos Aires, Argentina

Description: This symposium will present up-to-date work related to DNA damage replication processing in human cells. These processes which require translesion synthesis polymerases are necessary for cells to tolerate DNA lesions induced naturally or by exogenous agents, including chemotherapeutic agents.

Date/time: August 29, 2022, 10:30am – 12:30pm ET

New Aspects on Pol Zeta Regulation and Function in Mammalian Cells

Patricia Kannouche, Institut Goustave Roussi, Villejuif, France

Non-TLS (Translesion DNA Synthesis) Functions of TLS Polymerases

Vanessa Gottifredi, Fundación Instituto Leloir, Buenos Aires, Argentina

Linking DNA Replication Fork Dynamics with Chemotherapy Response

Alessandro Vindigni, Washington University School of Medicine, Saint Louis, Missouri, United States

The Key Role of Oxidative Stress in Translesion Synthesis Deficient Human Patient Cells (XP-V)

Natalia Cestari Moreno, National Institutes of Health, Rockville, MD, USA and Universidade de São Paulo, SP, Brazil

Polynucleotide Signatures and Regulation of Genotoxin Stress Response

Chairs: *Robert Sobol*, Mitchell Cancer Institute, University of South Alabama, Mobile, United States,
Bret Freudenthal, University of Kansas Medical Center, Kansas City, United States, *Aishwarya Prakash*, Mitchell Cancer Institute, University of South Alabama, Mobile, United States

Description: The three main polynucleotides that respond to and/or regulate DNA repair and the cellular response to genotoxic stress include DNA, RNA as well as the polymer of ADP-ribose, PAR. This symposium will discuss the unique and overlapping roles of these polynucleotides in regulation of and response to DNA damage.

Date/time: August 30, 2022, 10:30am – 12:30pm ET

RNA-mediated Regulation of Double Strand Break Repair

Francesca Storici, School of Biological Sciences, Georgia Institute of Technology, Georgia, United States

Poly-ADP-ribose in DNA Repair Regulation and Cellular Response to Genotoxins

Robert Sobol, Mitchell Cancer Institute (MCI), University of South Alabama, Mobile, United States

R-loop Roadblocks to Transcription and Replication

Chairs: *Philip Hanawalt*, Department of Biology, Stanford University, Stanford, United States, *Andrés Aguilera*, Centro Andaluz de Biología Molecular y Medicina Regenerativa (CABIMER), Universidad de Sevilla-CSIC, Seville, Spain, *Yesenia Rodriguez*, National Institute of Environmental Health Sciences Biology Laboratory, National Institute of Environmental Health Sciences, Durham, United States

Description: R-loops consist of an RNA-DNA duplex and an unpaired DNA strand that can form during transcription. Of particular importance are consequences when replication forks or transcription complexes collide with R-loops. We present mechanistic aspects of R-loop formation and their resolution to contribute to an improved understanding of their biological functions.

Date/time September 1, 2022, 1:30pm – 3:30pm ET

RNA-mediated Transcription-replication Conflicts as a Source of Genome Instability

Andrés Aguilera, Centro Andaluz de Biología Molecular y Medicina Regenerativa (CABIMER), Universidad de Sevilla-CSIC, Seville, Spain

Mechanisms for RNA-Mediated Genome Instability

Karlene Cimprich, Department of Chemical and Systems Biology, Stanford University School of Medicine, Stanford, United States

Investigating the Reasons Behind How R-Loops Can Become Deadly Upon Replication-transcription Conflicts.

Houra Merrikh, Department of Biochemistry, Vanderbilt University, Nashville, Tennessee, United States

Toxic R-loops as a Cause and Consequence of Replication Stress

Philippe Pasero, Institut de Génétique Humaine, CNRS and Université de Montpellier, Equipe Labélisée Ligue contre

Role of RNA in DNA Repair

Chairs: *Mats Ljungman*, University of Michigan, Ann Arbor, United States, *Heather O'Hagan*, University of Indiana, Bloomington, United States

Description: This symposium will bring together leading scientists from three continents to highlight the connections between RNA and DNA repair and discuss their implications for maintaining genomic integrity.

Date/time: August 30, 2022, 3:00pm – 5:00pm ET

How DNA Damage Affects RNA Splicing

Alberto Kornblihtt, University of Buenos Aires, Argentina

Molecular Mechanisms in Transcription-coupled DNA Repair

Martijn Luijsterburg, Leiden University, The Netherlands.

Role of ncRNA in DNA Damage Response Modulation

Fabrizio d'Adda di Fagagna, IFOM Milan, Italy

The Graham Walker Symposium: Complexity of Cellular Responses to DNA Damage

Chairs: *Iain Lambert*, Carleton University, Ottawa, Canada, *Bruce McKay*, Carleton University, Ottawa, Canada

Description: This symposium recognizes the extraordinary contributions of Graham Walker to the Mutagenesis and DNA Repair community. Graham is well known as an educator, an editor, and has been a leader in understanding the complexity of cellular responses to DNA damage in both bacteria and eukaryotes.

Date/time: August 30, 2022, 10:30am – 12:30pm ET

To be determined

Graham Walker, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

To be determined

Cynthia Kenyon, Calico Life Sciences, San Francisco, California, United States

To be determined

Lyle Simmons, University of Michigan, Ann Arbor, Michigan, United States

To be determined

Mark Sutton, University of Buffalo, Buffalo, New York, United States

DNA Cross-link Repair and Health

Chairs: *Sara Frias*, Instituto de Investigaciones Biomédicas UNAM/Instituto Nacional de Pediatría, Mexico City, Mexico, *Alfredo Rodríguez*, Instituto de Investigaciones Biomédicas, UNAM, Mexico City, Mexico

Description: ICLs are highly damaging DNA lesions. ICLs are recognized, removed and repaired by 22 genes of the FA / BRCA pathway; a zygote with biallelic mutation will be a patient with Fanconi anemia, while in somatic cells might cause cancer. Research in this area has generated important knowledge for cancer treatment.

Date/time: August 28, 2022, 3:00pm – 5:00pm ET

The FA/BRCA Pathway; Cellular and Clinical Consequences

Sara Frias, Instituto de Investigaciones Biomédicas UNAM, Instituto Nacional Pediatría, Mexico City, Mexico

Cell Fate Decisions in the Face of DNA Damage

Alfredo Rodríguez, Instituto de Investigaciones Biomédicas, UNAM, Mexico City, Mexico

Fanconi Anemia: From DNA Interstrand Crosslink Repair to Novel Therapies

Jordi Surralles, Servei de Genètica, Hospital de Sant Pau, Laboratoris LabSantPau, Barcelona, Spain

Ovarian Cancer as a Disease of DNA Repair

Anniina Färkkilä, Department of Obstetrics and Gynecology. University of Helsinki and Helsinki University Hospital, Finland

Ecogenotoxicology

From Genomes to Ecosystems: What are the Ecological Consequences of Genotoxicity?

Chairs: Jason O'Brien, Environment and Climate Change Canada, Ottawa, Canada, Gisela de Aragão Umbuzeiro, Universidade Estadual de Campinas, Campinas, Brazil, Awadhesh Jha, University of Plymouth, Plymouth, United Kingdom, Helina Gyasi, University of Ottawa, Ottawa, Canada

Description: In this symposium, we will share recent advances in the field of 'ecogenotoxicology'. We will also discuss how the Adverse Outcome Pathway framework is an effective organization and evaluation tool for promoting the regulatory utility of ecogenotoxicology evidence.

Date/time: August 30, 2022, 10:30am – 12:30pm ET

From Molecules to Ecosystems: An AOP-Based Perspective on the Current Status of the Field of Ecogenotoxicology

Jason O'Brien, National Wildlife Research Centre, Environment and Climate Change Canada, Ottawa, Canada

Knowing the Resistance: Omics for Screening and Understanding the Impacts of Insecticide Resistance in Non-target Species

Helen Poynton, School for the Environment, University of Massachusetts, Boston, United States

Ecogenotoxicological Effects Related to Coal Mining and Burning

Juliana da Silva, Universidade La Salle, Canoas, Brazil

Investigating the Genotoxicity of Polycyclic Aromatic Compounds from the Athabasca Oil Sands Area in Wildlife

Helina Gyasi, University of Ottawa, Ottawa, Canada

An Integrated Approach to Assess Impact of Emerging Contaminants on Aquatic Organisms

Awadhesh Jha, University of Plymouth, Plymouth, England, United Kingdom

Epigenetics

Analyses of DNA Modifications and their Roles in Human Carcinogenesis

Chairs: Haruhiko Sugimura, Hamamatsu University School of Medicine, Shizuoka, Japan, Silvia Balbo, University of Minnesota, Minneapolis, United States

Description: In contrast to rapid expansion of mutation signatures of cancers which may suggest individual carcinogenesis processes, our understanding of the whole scheme of the ultimate DNA changes just before mis-pairing causing mutation in the human body are still incomplete. Updated information on comprehensive adductomics approaches that can be applied in humans will be shares in this symposium.

Date/time: August 28, 2022, 10:30am – 12:30pm ET

Human Adductomics, Challenges

Haruhiko Sugimura, Hamamatsu University School of Medicine, Shizuoka, Japan

Untargeted DNA Adductomics

Silvia Balbo, University of Minnesota, Minneapolis, Minnesota, United States

Measuring 5-hmC in Human Samples After Exposures

Yuval Ebenstein, Tel Aviv University, Tel Aviv, Israel

To be determined

Guo Jingshu, University of Minnesota, Minneapolis, Minnesota, United States

Genomics

Dynamics of Mutation Acquisition in Somatic Cells: SNVs and SVs in the Brain, Blood and Beyond

Chairs: *Thomas Wilson*, University of Michigan, Ann Arbor, United States, *Thomas Glover*, University of Michigan, Ann Arbor, United States, *Natalie Saini*, Medical University of South Carolina, Charleston, United States

Description: Mutagenesis is ongoing in all cells. This session focuses on genomic technologies capable of detecting low frequency mutations. We will explore what these approaches are telling us about the states of genomes in tissues and how somatic mutations contribute to alterations over time in tissue function, development, aging and disease.

Date/time: September 1, 2022, 10:30am – 12:30pm

Somatic Mutations in Normal Tissues

Peter Campbell, Wellcome Sanger Institute, United Kingdom

Novel Approaches for Structural Variant Detection in Single Cells

Jan Korbel, EMBL, Heidelberg, Germany

Oncologic Therapy Shapes the Fitness Landscape of Clonal Hematopoiesis

Elli Papaemmanuil, Memorial Sloan Kettering Cancer Center, New York City, New York, United States

Programmed and Sporadic Mutations in Normal Brain Function and Cancer

Bjoern Schwer, University of California, San Francisco, United States

Lessons from the Brain Somatic Mosaicism Network

Michael J. McConnell, Lieber Institute for Brain Development, Baltimore, Maryland, United States

Germ Cell and Heritable Effects

Consequences of Pharmaceuticals and Chemicals for Male and Female Germ Cells and Heritability

Chairs: *Jill Escher*, Escher Fund for Autism, San Jose, California, United States, *Bernard Robaire*, McGill University, Montreal, Canada

Description: It has become increasingly clear that certain exposures and toxicants can adversely impact the genetic and/or epigenetic integrity of germ cells, that is, eggs, sperm, and their lineage of precursors, raising serious questions for toxicology and public health. This symposium highlights some of the significant findings.

Date/time: August 29, 2022, 10:30am – 12:30pm ET

Paternally Mediated Developmental Toxicity

Bernard Robaire, McGill University, Montreal, Canada

Polycomb Dependent Epigenetic Programming in Oocytes: Setting Developmental Outcomes for the Next Generation

Patrick Western, Hudson Institute for Medical Research, Melbourne, Australia

Germline Exposure to Sevoflurane Results in Dysregulation of Brain-Related Genes in Offspring

Vesna Jevtovic-Todorovic, University of Colorado, Aurora, Colorado, United States

General Anesthetics Induce Epigenetic Alterations in Germ Cells that Result in Autism-like Behaviors

Hsiao-Lin V. Wang, University, Atlanta, Georgia, United States

De novo Germline Mutations and Environmental Mutagenesis

- Chairs:** Kenichi Masumura, Division of Genetics and Mutagenesis, National Institute of Health Sciences, Kanagawa, Japan, Jonatan Axelsson, Division of Occupational and Environmental Medicine, Lund University, Lund, Sweden, Mathia Colwell, University of Minnesota, St. Paul, United States
- Description:** Germline mutations are sources of genomic variation between populations and species. This symposium will present current studies of detection of de novo germline mutation and discuss how genetic or environmental factors affect mutation rate and spectra. Talks will demonstrate how experimental approaches using mouse models are also valuable for studying these issues.
- Date/time:** August 30, 2022, 10:30am – 12:30pm ET

Mutagenicity in Germ Cells and De novo Mutations in the Offspring

Kenichi Masumura, Division of Genetics and Mutagenesis, National Institute of Health Sciences, 3-25-26 Tonomachi, Kanagawa, Japan

Analysis of De novo Germline Mutations in DNA Repair Deficient Mice Lines

Mizuki Ohno, Department of Medical Biophysics and Radiation Biology, Faculty of Medical Science, Kyushu University 3-1-1, Maidashi, Higashi-ku, Japan

Using RNA to Study De novo Mutations in Germ Cells

Jeffrey Rosenfeld, Rutgers Cancer Institute of New Jersey, New Brunswick, New Jersey, United States

The Key Role of Oxidative Stress in Translesion Synthesis Deficient Human Patient Cells (XP-V)

Natalia Cestari Moreno, National Institutes of Health (NIH), Rockville, Maryland, United States and Universidade de Sao Paulo, SP, Brazil

In Vivo Genotoxicity Assessment

Novel Experimental Strategies for Investigating the Incidence and Mechanisms of Mutations

- Chairs:** Steve Rozen, Duke-NUS Centre for Computational Biology, Duke-NUS Medical School, Singapore, Singapore, Bevin Engelward, MIT Biological Engineering, Cambridge, United States
- Description:** New strategies let us exhaustively study patterns of DNA changes induced by mutagens in animal or cell-culture systems. These new strategies leverage whole genome sequencing to provide data that are unbiased and that are more extensive and informative with respect to mechanisms and patterns of mutations than classical reporter systems.

Date/time: August 30, 2022, 3:00pm – 5:00pm ET

Experimental Delineation of Mutational Signatures

Jiri Zavadil, International Agency for Research on Cancer, WHO, Lyon, France

Mutational Signatures of Environmental and Chemotherapeutic Agents in Human Stem Cells and Organoids

Jill Kucab, Department of Analytical, Environmental and Forensic Sciences, King's College, London, United Kingdom

Opportunities and Challenges in Using Mutational Signature Analysis to Illuminate Cancer Biology and Epidemiology

Steve Rozen, Duke-NUS Centre for Computational Biology, Duke-NUS Medical School, Singapore

The Causes Underlying Human Somatic Mutagenesis

Natalie Saini, Department of Biochemistry and Molecular Biology, Medical University of South Carolina, Charleston, South Carolina, United States

Application of Mutational Signatures of Carcinogens as Biomarkers of Cancer

John Essigmann, MIT Departments of Chemistry and Biological Engineering, Cambridge, Massachusetts, United States

Public Health and Molecular Epidemiology

Approaches for Studies of DNA Damage and Repair with Applications in Human Biomonitoring and Disease Risk Prevention

Chairs: *Andrew Collins*, University of Oslo, Oslo, Norway, *Bevin Engelward*, MIT, Cambridge, United States, *Sabine Langie*, Maastricht University, Maastricht, Netherlands

Description: To be determined.

Date/time: September 1, 2022, 1:30pm – 3:30pm ET

The Comet Assay: Past Success and Future Promise

Andrew Collins, University of Oslo, Oslo, Norway

Measuring Nucleotide Excision Repair in at Risk Populations

Laura Neidernhoffer, University of Minnesota, School of Medicine, Minneapolis, Minnesota, United States

The Comet Assay as a Human Biomonitoring Tool

Sabine Langie, Maastricht University, The Netherlands

Use of the CometChip for Public Health and Molecular Epidemiology

Bevin Engelward, Massachusetts Institute of Technology, Boston, Massachusetts, United States

Genotoxic Hazards of Air Pollution- A Global Perspective

Chairs: *Paul White*, Health Canada, Ottawa, Canada, *Gisela de Aragão Umbuzeiro*, State University of Campinas, Campinas, Brazil, *David DeMarini*, University of North Carolina, Chapel Hill, North Carolina, United States

Description: This symposium will review the mechanistic evidence regarding the carcinogenicity of outdoor air. It will provide information about the mutagenicity of polluted air in Europe, South America, and Asia, and an overview of the types of mutations induced by the particulate and gas phase components of polluted outdoor air.

Date/time: August 28, 2022, 3:00pm – 5:00pm ET

IARC Evaluation of Air Pollution Carcinogenicity: Supporting Mechanistic Evidence

Paul White, Health Canada, Ottawa, Ontario, Canada

Comparative Genotoxicity of Airborne Particulate Matter from Three Continents

Gisela Aragão Umbuzeiro, State University of Campinas, Campinas, Brazil

Mutagenicity and Carcinogenicity of the Gas Phase and Particulate Components of Polluted Air

David DeMarini, University of North Carolina, Chapel Hill, North Carolina, United States

Mutagenic Hazards of Air Pollution in Asia

Kazuichi Hayakawa, Kanazawa University, Nomi-City, Ishikawa-Prefecture, Japan

Association Between Particulate Matter Abundance and the Mutagenic Activity of Polluted Air

Tiziana Schilirò, Department of Public Health and Pediatrics, University of Torino, Torino, Italy

Impact of Obesity on DNA Stability and its Health Consequences

Chairs: *Siegfried Knasmueller*, Institute of Cancer Research, Medical University Vienna, Vienna, Austria, *Helga Stopper*, Institute of Pharmacology and Toxicology, University of Wuerzburg, Wuerzburg, Germany, *Vanessa Moraes de Andrade*, Laboratorio de Immunologia e Mutagenese, UNESC, Santa Catarina, Brazil

Description: Most activities in genetic toxicology focus on chemicals. Recent investigations indicate that obesity, which is increasing worldwide, plays an important role that was underestimated. The contributions describe the mechanisms by which obesity causes DNA-damage and the impact of dietary interventions and weight loss on the integrity of the genetic material.

Date/time: August 28, 2022, 3:00pm – 5:00pm ET

Overweight and DNA Damage – An Overview

Siegfried Knasmueller, Institute of Cancer Research, Medical University, Vienna, Austria

Impact of Obesity on DNA Structure Induced Genetic Stability

Karen Vasquez, Division of Pharmacology and Toxicology, College of Pharmacology, Univ. of Texas Austin, Texas, United States

Prevention of Obesity Induced DNA Damage by Dietary Antioxidants

Vanessa Moraes de Andrade, Laboratorio de Immunologia e Mutagenese, Universidade de Extremo Sul Catarinense (UNESC), Criciuma, Santa Catarina, Brazil

Reduction of Genomic Damage by Weight Loss

Helga Stopper, Institute of Pharmacology and Toxicology, University of Wuerzburg, Wuerzburg, Germany

Association Between Dietary Intervention and Telomere DNA Repair Dynamics, Implications on Obesity Related Disorders

Prakash Hande, Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Personalized Cancer Risk and Prevention: Models Integrating Genetics, Environmental Exposures, Infections, Diet, and Other Factors for Specific Cancers

Chairs: *Rosalie Elespuru*, US Food and Drug Administration, Silver Spring, Maryland, United States, *Jonatan Axelsson*, Division of Occupational and Environmental Medicine, Lund, Sweden, *Clarissa Ribeiro Reily ROCHA*, Departamento de Microbiologia, Instituto de Ciencias Biomedicas, Universidade de Sao Paulo, Sao Paulo, Brazil

Description: Cancer risk assessment is performed generally in relation to exposure to products such as drugs and other therapies, or to environmental exposures. This symposium includes an examination of the potential for personalized cancer risk and prevention, exploring the factors known for involvement in the development of specific cancers in humans.

Date/time: August 30, 2022, 3:00pm – 5:00pm ET

Shifting the Paradigm from Cancer Risk Assessment to Personalized Cancer Prevention

Rosalie Elespuru, US Food and Drug Administration, Silver Spring, Maryland, United States

Colorectal Cancer Risk Factors and their Potential for Precision Prevention

Minyang Song, Harvard School of Public Health, Cambridge, Massachusetts, United States

Risk Prediction of Gastric Cancer in Asian Populations: its Potential Application to Personalized Prevention and Screening

Shoichiro Tsugane, National Institutes of Biomedical Innovation, Health and Nutrition, Saito Asagi, Ibaraki City, Osaka, 567-0085, Japan

Radiation Biology

Managing Genes in Space

Chairs: William Kaufmann, Past-President of EMGS, Durham, North Carolina, United States, Vinita Chauhan, Health Canada, Ottawa, Canada

Description: Space exploration carries risks from exposure to stressors including solar and extra-solar radiation. Knowledge on the mechanism of these effects on humans can inform development of countermeasures to mitigate or prevent harm. This symposium, Managing Genes in Space, presents our current understanding of how space radiation may harm humans.

Date/time: September 1, 2022, 10:30am – 12:30pm ET

Effects of Space Radiation on Brain Structure and Function

Janet Baulch, University of California, Irvine, California, United States

Effects of Galactic Cosmic Rays and Other Environmental Factors in Space on the Cardiovascular System

Marjan Boerma, University of Arkansas for Medical Sciences, Little Rock, Arkansas, United States

Individual Susceptibility to Cancer from Space Radiation Exposure

Michael Weil, Colorado State University, Fort Collins, Colorado, United States

Risk Assessment

In Vitro Screening Approaches for Risk Assessment

Chairs: Olivier Taboureaux, Université de Paris, Paris, France, Xiaoqing (Carol) Guo, National Center for Toxicological Research, FDA, Jefferson, Arkansas United States, Ji-Eun Seo, National Center for Toxicological Research, FDA, Jefferson, Arkansas, United States

Description: With advancements in *in vitro* systems along with large scale screening efforts, IVIVE approaches, and development of massive dimensionality, *in vitro* screening for toxicological characterization and risk assessment will be covered through a number of the recent advances in *in vitro* toxicity testing.

Date/time: August 28, 2022, 3:00pm – 5:00pm ET

High-throughput Molecular Profiling Assays and Potential Applications in Chemical Risk Assessment

Joshua Harill, U.S. Environmental Protection Agency, Durham, North Carolina, United States

Using In Vitro to In Vivo Extrapolation (IVIVE) to Apply Genetic Toxicity Data to Regulatory Risk Assessment

Marc Beal, Health Canada, Ottawa, Ontario, Canada

Genotoxicity Assessment of Nanoparticles in Advanced Liver and Lung Models

Elisabeth Elje, NILU-Norwegian Institute for Air Research, Kjeller, Norway

How In Vitro 3D Tissue Models can be Utilized in the Assessment of Genotoxicity Risk

Stefan Pfuhler, Procter & Gamble, Cincinnati, Ohio, United States

Improving the Utility of In Vitro Screening Through Combined In Silico Modeling to Better Predict and Test Health Risks of Environmental Chemicals

Julia Rager, University of North Carolina, Chapel Hill, North Carolina, United States

New Approaches for Informing Population Variability in Chemical Risk Assessment

- Chairs:** Catherine Gibbons, US EPA, Washington, D.C., United States, Michael Stewart, US EPA, Washington, D.C., United States, Chelsea Weitekamp, US EPA, Washington, D.C., United States
- Description:** The speakers in this session will present innovative methods for identifying sources of susceptibility to environmental exposures, analyses of novel data streams and computational approaches to quantitatively estimate interindividual variability, and examples of improved approaches for characterizing population variability in human health risk assessment.
- Date/time:** August 30, 2022, 10:30pm – 12:30pm ET

Epidemiological Studies Linking DNA Repair to Disease Susceptibility

Mary Beth Terry, Columbia Mailman School of Public Health, New York City, New York, United States

Analysis of Environmental Susceptibility Data Using Novel Bioinformatics Approaches

Weihsueh Chiu, Texas A&M University, College Station, Texas, United States

Approaches to Addressing Variability at OEHH

Vince Cogliano, California Environmental Protection Agency, Sacramento, California, United States

New Tools in Carcinogenicity Testing

- Chairs:** Patricia Escobar, Merck & Co. Inc., West Point, United States, Barbara Parsons, US Food & Drug Administration, National Center for Toxicological Research, Jefferson, United States, Xilin "Shan" Li, National Center for Toxicological Research, Jefferson, United States

- Description:** This symposium will address the question of whether high-dimensional genetic analyses and/or in vitro screening of pathways relevant to known modes of carcinogenic action can provide early predictions of carcinogenic risk from chronic exposures.

- Date/time:** August 30, 2022, 10:30am – 12:30pm ET

State of the Science in Assessment of Carcinogenic Potential and Updates on ICH S1

Frank Sistare, Merck & Co. Retired, West Point, Pennsylvania, United States

Toxicogenomics in Carcinogenic Risk Assessment

Heidrun Ellinger-Zeiglbauer, Bayer Health Care, Leverkusen, Germany

Developing Duplex Sequencing for Analysis of Clonal Expansion in the Assessment of Genotoxic and Non-genotoxic Carcinogens

Keith Tannis, Merck & Co, West Point, Pennsylvania, United States

Relationship Between Cancer Driver Mutation Based Biomarkers and Tissue-specific Tumor Susceptibility in Rodents

Kelly Harris, US Food & Drug Administration, National Center for Toxicological Research, Jefferson, Arkansas, United States

Risk Assessment of Low-dose Rate Radiations, Lessons from the Fukushima Nuclear Accident

Chairs: Takayoshi Suzuki, National Institute of Health Sciences, Kawasaki, Japan, Yoshihisa Matsumoto, Tokyo Institute of Technology, Tokyo, Japan

Description: The health hazards caused by low-dose radiation are a serious problem for the residents of Fukushima after the Nuclear Plant accident. Thyroid examinations of children were conducted as part of a health survey. This symposium was proposed to re-evaluate the health risks of low-dose radiation.

Date/time: August 30, 2022, 10:30am – 12:30pm ET

Long-term Strategies for Thyroid Health Monitoring After Nuclear Accidents: Recommendations from an Expert Group Convened by IARC

Kayo Togawa, International Agency for Research on Cancer, World Health Organization, Lyon, France

Risk Assessment in Human Population Exposed to Low-dose Radiation: A Challenging Task for Radiation Protection Science

Birajalaxmi Das, Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India

Studies on Long-term Effects of Chronic Low-dose Rate Radiation Exposure at the Institute for Environmental Sciences, Japan

Ignacia Braga Tanaka, Advanced Molecular Bio-Sciences Research Center, Institute for Environmental Sciences, Hacchazawa, Takahoko. Rokkasho, Aomori, Japan

Role of Radiation Scientists in Risk Communication: Lessons From 10 years After Fukushima Daiichi Nuclear Power Plant Accident

Yoshihisa Matsumoto, Ookayama, Meguro-ku, Tokyo, Japan

Using Quantitative Genetic Toxicology to Advance the Assessment of Genotoxic Impurities in Pharmaceuticals

Chairs: George Johnson, Swansea University, Swansea, United Kingdom, Andreas Zeller, Hoffman La Roche, Basel, Switzerland, Alexandra Long, University of Toronto, Toronto, Canada

Description: The symposium will inform on the most recent developments in this field, by first explaining basic concepts, pointing out advantages and remaining issues, and advise on best practices. Several case examples will be used to demonstrate field applicability of the concepts. Topics will include recommendations for suitable benchmark response (BMR) / critical effect size (CES) values, a set of assessment factors (AF) to account for extrapolation across species as well as interindividual differences, cellular scavenging/compensation, variability of human DNA repair capacity, and possible effect severity. There will be time allocated to a panel discussion, to ensure a thorough level of debate and investigation.

Date/time: September 1, 2022, 10:30am – 12:30pm

Quantitative Analysis of In Vivo Mutagenicity Dose-response Data for Risk Assessment and Regulatory Decision-making: A Case Study of Alkyl Nitrosamines

George Johnson, Swansea University, Swansea, United Kingdom

Current Regulatory Risk Assessment Procedure and Regulatory Concerns with Using Quantitative Genetic Tox Data for Risk Assessment

Roland Frotschl, BfArM, Germany

Strategies for Assessing Nitrosamine Impurities

Anthony Lynch, GlaxoSmithKline, London, England, United Kingdom

Optimizing the Adjustment Factors used for Genotoxic Impurities

Alexandra Long, University of Toronto, Toronto, Ontario, Canada

Excursions

Open Afternoon

Wednesday, August 31, 2022
12:30pm – 6:00pm ET

Canadian Museum of Nature & Canadian War Museum (4 hours)

Explore Canada in a more in-depth way by attending the Canadian Museum of Nature and the Canadian War Museum. *The Canadian Museum of Nature's* scientific research occurs across Canada, from coast to coast on the territories of the Métis and First Nations people and in Inuit Nunangat. The galleries at the Museum of Nature include the Fossil Gallery, Water Gallery, Nature Live, Bird Gallery, Earth Gallery, Mammal Gallery, and the Canada Goose Arctic Gallery. *The Canadian War Museum* traces back to 1880 and is Canada's national museum of military history and one of the world's most respected museums for the study of understanding armed conflict. The exhibition galleries and programs are designed to emphasize the human experience of war. The Special Exhibits being displayed during ICEM 2022 include "Forever Changed – Stories from the Second World War" and "Liberation! Canada and The Netherlands, 1944-1945".

The tour will begin at 1:00pm ET and depart from the Westin Ottawa hotel lobby by bus 20 minutes before the start of the tour at 12:40pm ET. Cost is \$89 USD per person (minimum number for tour is 25, maximum number of persons for this tour is 50). This tour includes:

- Tour escort will assist everyone with bus transportation and check-in at the Museum admission, bus transportation will be provided to take participants to and from the hotel and each museum
- 45 – 60-minute guided tour at each Museum
- Participants will be provided with a bottled water and an energy bar

Added feature: Explore the Glebe- pick up a coffee or snack at your leisure during a 30-minute stop exploring this iconic Ottawa Neighborhood, filled with boutiques and restaurants.

Ottawa River Tour (2.5 hours)

See Ottawa from a different perspective- by boat! Enjoy the calm of the Ottawa River and indulge in an experience like no other as you discover Ottawa by yacht.

The tour will begin at 1:15pm ET/boat sailing at 2:00pm. The tour departs from the Westin Ottawa hotel lobby 20 minutes before start time at 12:55pm ET. Cost is \$46 USD per person (minimum number for tour is 15, maximum number of persons for this tour is 50).

- Tour escort to assist with wayfinding to the Boat Dock and check-in
- A guided tour of the Ottawa River and points of interest along the river shoreline
- Participants will be provided with bottled water and an energy bar
- A selection of beverages and snacks will be available for purchase on the boat
- You may bring your own food/snacks/drinks on the tour
- Tour will proceed rain or shine

13th International Conference on Environmental Mutagens

Ottawa Walking Tour (2 hours)

This guided walk takes you through the historical highlights of downtown Ottawa, including stops at:

- Parliament Hill
- The National War Memorial
- Sparks Street
- Major's Hill Park
- The Fairmont Chateau Laurier
- The Bank of Canada
- The Rideau Canal
- The Prime Minister's Offices
- The By Ward Market
- And other areas of interest

The tour begins at 1:45pm ET and departs from the Westin Ottawa hotel at 1:25pm ET. Cost is \$21 USD per person (minimum number for tour is 15, maximum number of persons for tour is 45).

- Tour escort to accompany group on walking tour and to share points of interest and background on key landmarks and locations
- Participants will be provided with bottled water and an energy bar
- Walking tour will proceed rain or shine

Ottawa Cycling Tour (3 hours)

Departing from the hotel, the group will take a short walk to the Bicycle location to get fitted with their ride. Our route begins from Sparks Street heading to the War Memorial. Next, a leisurely ride on the Rideau Canal Pathway will give you a beautiful view of Ottawa's downtown and popular Byward market neighborhood. Continuing cycling, we will visit Rideau Hall, Rideau Falls, and cross the bridge to visit the beautiful province of Quebec. Cycling back through Voyageurs and Ottawa River pathways (or Sir John A. MacDonald Parkway) you will see and hear more of Ottawa's beauty and major attractions including Parliament Hill, the National Art Gallery and Museum of History. The Rideau Locks and Bytown Museum will be the last attractions before returning to the starting point of this fun tour. The cycle tour is suited to all levels of experience and runs rain or shine.

The tour begins at 1:30pm ET and departs from the Westin Ottawa hotel lobby at 1:10pm ET. Cost is \$55 USD per person (minimum number for tour is 12, maximum number of persons for tour is 48).

- Tour will include a bike rental sized to your height and helmet
- Tour escort will assist with wayfinding to the Bike Rental location
- Tour escort to share points of interest and background on key landmarks and locations
- Participants will be provided with bottled water and an energy bar
- Walking tour will proceed rain or shine

Satellite Meetings

Samuel H. Wilson Memorial meeting: DNA Damage & Repair – *Inspiring basic and applied research on the crucial importance of genome maintenance mechanisms*

Chairs: Robert Sobol, University of South Alabama, Mobile, Alabama, United States

Date/time: Friday, August 26, 2022, 8:00am – 6:00pm ET

Description: This one-day session will highlight cutting edge research from both established leaders and junior trainees on DNA repair mechanisms, with emphasis on their importance for basic and environmental health sciences. The session will exemplify the same dedication to scientific discovery and support for trainees that was a lifelong pursuit of Sam Wilson over his productive and impactful career.

9th International Workshops on Genotoxicity Testing (IWGT)

The 8th International Workshops on Genotoxicity Testing (IWGT), a satellite meeting of the ICEM, will be held August 23 - 26, 2022 at the nearby University of Ottawa. The goal of the IWGT is to gain consensus on current issues and approaches in genetic toxicology. World-leading experts representing different subject areas are assembled; recommendations on test systems, strategies and approaches are discussed and debated. The outcome, with accompanying consensus statements, are published in a peer-reviewed scientific journal. The 8th IWGT will include Working Groups that collectively address the following topics:

- Transcriptomic Biomarkers
- Predictivity of In Vitro Genotoxicity Testing
- Genotoxicity dose-response Analysis for Potency Comparisons and Risk Assessment
- In Vivo Genotoxicity Assessment Strategies
- Statistical Approaches and Data Interpretation

In addition, two plenary sessions will provide state-of-the-art information pertaining to:

- Epigenotoxicity and Germ Cell Effects
- Gene Therapy

Guests are welcome to observe and contribute to the discussions. For more information on registration and participation, please contact the IWGT secretariat at iwgt@affinityevents.com

ICEM REGISTRATION GUIDELINES

Please register online at www.icem2022.org

Registration

Attendees are encouraged to register online for the 13th ICEM. Online registration is available through the website: www.icem2022.org.

All payments must be in U.S. currency. No phone registrations will be accepted.

Payment by check: Please send Registration Form to the EMGS & IAEMGS Headquarters located at 12627 San Jose Blvd., Suite 202, Jacksonville, Florida 32223-8638

USPS/Express packages may be mailed to: EMGS & IAEMGS Headquarters 12627 San Jose Blvd., Suite 202, Jacksonville, Florida 32223-8638

Forms will be date-stamped as they arrive. This is your date of registration. Faxes will be accepted by EMGS & IAEMGS Headquarters only if a credit card number is clearly listed in the appropriate area.

NOTE: To prevent double-billing, if you are registering by fax, DO NOT mail your registration form. EMGS only needs one copy for processing. All mailed and fax registration forms will be processed online by EMGS staff.

Payment Information

Registration Forms will be returned if not accompanied by one of the following methods of payment:

Check (Company or personal); U.S. Currency only. Please list all registrants on check memo or check stub

- Money Orders
- U.S. Government Purchase Orders (Check must be drawn from the U.S. Department of Treasury)
- Visa, MasterCard, Discover or AmericanExpress

Registration Deadlines

Early Bird Registration by May 1, 2022

Standard Registration May 2 – August 5, 2022

DO NOT mail your Registration Form to EMGS if it will arrive after August 5, 2022. EMGS will accept 13th ICEM Registrations until August 5. After August 5, 2022 registrations will only be accepted onsite at the meeting.

Accompanying Person Registration: Accompanying Person registrants are welcome to attend the Welcoming Reception and Banquet, but will not have access to the scientific sessions or the Exhibit Hall.

One-day registration: There is no reduced fee for one-day registration.

Optional Registration Items

Tour Registration: Tours are not included with your registration. Separate registration is required to attend the tours. You can register for the tours online at www.icem2022.org.

Banquet Registration: The Banquet is included in the Registration fee.

Workshop Registration: Registration participants in the 13th ICEM may enroll in one of the courses offered on Sunday morning. Five workshops will be held on Saturday, August 27. Separate registration is required to attend a workshop. The workshops will run concurrently, allowing you to register for only one workshop. Please mark the appropriate place on the online or physical registration form if you will be attending a workshop.

Satellite Meeting Registration: Separate registration is required for each satellite meeting. Reference page 42 for registration details. You do not have to be registered for the 13th ICEM to attend a Satellite Meeting.

Tickets

Tickets and badges are required for the banquet and sessions. Tickets are required for each of the tours and require a separate registration.

Special Interest Groups Meetings

Special Interest Group meetings do not include breakfast. All registrants are invited to attend any of the Special Interest Groups which will be held at 7:00am each morning.

Confirmation

You will receive a registration confirmation by email immediately following your registration when you register online. All other confirmations will be mailed to you prior to the meeting if your registration form is received prior to August 5, 2022. You may pick up your badge and meeting materials onsite beginning Sunday, August 28, 2022.

Cancellation/Refund Policy

All requests for cancellations and/or refunds must be received in writing to EMGS & IAEMGS Headquarters by August 5, 2022. These refunds will be processed, less a \$25 fee, following the Annual Meeting. Refund requests received after August 5, 2022 will not be processed. There are no substitutions.

13th International Conference on Environmental Mutagens August 27 – September 1, 2022

Attendees are encouraged to register online for the 13th ICEM. Online registration is available through the website www.icem2022.org.

(Required: Please check the appropriate box) PLEASE PRINT OR TYPE (Black ink only)

First Name/Middle Initial: _____ Preferred Pronouns: _____

Last Name: _____ Professional Degree(s): _____

Badge Name Preference: _____

Company Name: _____

Department: _____

Street Address: _____

City: _____ Prov/State: _____ Zip: _____ Country: _____

Area Code/Phone Number: _____

Email Address: _____

If you are a student or post-doc registrant, please provide the following information:

☐ Post-doc ☐ Graduate Student ☐ Undergraduate Student

Institution: _____ Advisor's Name: _____

Advisor's Phone Number: _____ Advisor's Email: _____

All payments must be in U.S. currency. No phone registrations will be accepted.

Payment by check, please send Registration Forms/USPS/Express Packages to EMGS & IAEMGS Headquarters: 12627 San Jose Blvd., Suite 202, Jacksonville, Florida 32223-8638

13th ICEM Registration Fees

Early Bird Registration Standard Registration On-Site Registration
(Received by May 1, 2022) (May 2 – August 5, 2022) (After by August 5, 2022)

Regular Delegates.....	\$775.....	\$825	\$975	\$
Student or Postdoctoral.....	\$375.....	\$435	\$475	\$
Emeritus.....	\$375.....	\$435	\$475	\$
Accompanying Person.....	\$250.....	\$325	\$375	\$
(Includes welcome reception, banquet, and the wine and cheese reception)				

Banquet

The Banquet will be held on Wednesday, August 31 from 6:00pm until 10:00pm in the Grand Hall of the Canadian Museum of History. The Banquet is included in the registration fee. Please indicate if you will be attending the Banquet.

☐ Yes ☐ No

Wine & Cheese Reception

The Wine & Cheese Reception will be held on Monday, August 29 from 6:30pm until 8:00pm in the National Gallery of Canada. The Wine & Cheese Reception is included in the registration fee. Please indicate if you will be attending.

☐ Yes ☐ No

Workshops

Yes, I would like to attend one of the Workshops on Saturday, August 27, 2022. (Please check the box of the course you will attend.

- ☐ Advancing the Next Generation of Genetic Toxicology and Cancer Risk Assessment
- ☐ In silico Approaches in Genetic Toxicology: Application Ames QSAR to ICH-M7
- ☐ Methods and Applications of the CometChip and Additional Cell Microarray Technologies
- ☐ Mini versus Standard Ames Assays: What Have We Learned from the OECD's Comparative Evaluation
- ☐ Time to Solve a Crisis? Can Risk Stemming from Exposures to Plant-based DNA-reactive Pyrrolizidine Alkaloids be Managed Using Relative Potency Factors (RPF's)?

Early Bird Registration Standard Registration On-Site Registration
(Received by May 1, 2022) (May 2 - August 5, 2022) (After by August 5, 2022)

Regular Delegates.....	\$125.....	\$175.....	\$225.....	\$.....
Postdoc/Student.....	\$65.....	\$115.....	\$165.....	\$.....
Emeritus.....	\$65.....	\$115.....	\$165.....	\$.....

Satellite Meetings

Yes, I would like to attend the satellite meeting on Friday, August 22, 2022 from 8:00am to 6:00pm:

- ☐ Samuel H. Wilson Memorial Meeting: DNA Damage & Repair

Student & New Investigator/ Emeritus Registration.....	\$50.....	\$.....
Regular Registration.....	\$100.....	\$.....

Afternoon Excursions

Afternoon Excursions will occur during the Free Afternoon on Wednesday, August 31, 2022 from 12:30pm until 6:00pm. Please select which tour you would like to participate in, please remember to only choose one:

- ☐ Canadian Museum of Nature & Canadian War Museum – 4 hours.....\$89.....\$.....
- ☐ Ottawa River Tour – 2.5 hours.....\$46.....\$.....
- ☐ Ottawa Walking Tour – 2 hours.....\$21.....\$.....
- ☐ Ottawa Cycling Tour – 3 hours.....\$55.....\$.....

Method of Payment

All registrants submitted by hard copy or fax will be processed online by EMGS staff.

TOTAL DUE: \$_____

☐ Check or Money Order #: _____

☐ Government Purchase Order # _____ (U.S. Government P.O. Form must be attached)

☐ American Express

☐ Discover

☐ MasterCard

☐ Visa

Credit Card #: _____ Expiration Date: _____

Cardholder's Printed Name: _____ CVC #: _____

Signature: _____

Special Services

If you require special services, please describe on the line(s) below. For more information about special services, please call EMGS & IAEMGS Headquarters and ask for Kailee Canty (904) 719-8484 or email kaileec@emgs-us.org



- 1 **The Westin Ottawa**
11 Colonel By Drive, Ottawa
- 2 **Fairmont Château Laurier**
1 Rideau Street, Ottawa
- 3 **Les Suites Hotel Ottawa**
130 Besserer Street, Ottawa
- 4 **Lord Elgin Hotel**
100 Elgin Street, Ottawa

- 5 **Canadian Museum of History**
100 Laurier Street, Gatineau
- 6 **National Gallery of Canada**
100 Laurier Street, Gatineau



**Environmental
Mutagenesis and
Genomics Society**
Synergistic Interactions for a Better World



We will see you there!

13th International Conference on

Environmental Mutagens

Maintaining Genomic Health in a Changing World



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Synergistic Interactions for a Better World



August 27 - September 1, 2022
Ottawa, Ontario, Canada

Register Early!

Early Bird Registration is January 2 - May 1, 2022

**Registration prices increase after May 2, 2022*

Book your Ottawa stay!

Special rates at the Westin Ottawa have been
contracted for ICEM registrants, book your stay before
June 28, 2022

**See a full breakdown of prices and hotels on page 13 of the brochure*

Important Dates & Deadlines:

Awards and Honors Nomination: December 10, 2021

Travel Award Application: February 28, 2022

Abstract Submission: April 1, 2022

www.ICEM2022.org